Roll No.

**Total No. of Questions: 11** 

M.Sc. (Chemistry) (Sem. – 2)

# SPECTROSCOPY-II

# Subject Code: CHL-414-18

## M Code: 75984

# Date of Examination : 19-12-2022

Time: 3 Hrs.

INSTRUCTIONS TO CANDIDATES:

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains EIGHT questions carrying FIVE marks each and students have to attempt any SIX questions.
- 3. SECTION-C is COMPULSORY consisting of TWO questionswith internal choice carrying TEN marks each.

### **SECTION-A**

#### 1. Write briefly:

- a) What is the rigid rotator?
- b) Explain fundamental frequency in vibrational spectroscopy.
- c) Explain the polarized raman lines.
- d) What is the principle of Mossbauer spectroscopy?
- e) What are selection rules of EPR?
- f) What is basic principle of PES?
- g) Explain the force constant in vibrational spectroscopy.
- h) What is basic selection rule for NQR?
- i) What is chemical shift in NQR?
- j) What is difference between simple spin states and high spin states?

Total No. of Pages: 02

Max. Marks: 70

### **SECTION-B**

- 2. What are the molecular orbital diagram of oxygen?
- 3. Explain the 3N-5 and 3N-6 rule.
- 4. What is quadrupole splitting?
- 5. Explain mutual exclusion principle.
- 6. Explain the isotopic substitution effects.
- 7. Explain the spectral parameters in mossbauer.
- 8. Explain the factors affect the magnitude of g value.
- 9. Explain the exchange splitting in XPS.

### **SECTION-C**

10. Explain the zero filed splitting and Krammer degeneracy.

### OR

Explain the Vibrational spectrum of H<sub>2</sub>O.

11. Explain the vibrational-rotational raman spectra.

## OR

Explain the additive application to <sup>57</sup>Fe and <sup>119</sup>Sn in Mossbauer.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.